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The Iowa Crop Management Database: An Agronomic and Economic Information Recording Tool

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THE IOWA CROP MANAGEMENT DATABASE
AN AGRONOMIC AND ECONOMIC INFORMATION RECORDING TOOL

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Summary

The Crop Management Database is a valuable tool to analyze the agronomic and economic information of crop production. The lowest cost producers balance the agronomic needs of the farm with good economical management decisions.

Introduction

Outreach education by Iowa State University Extension (ISUE) Agronomy and Economics departments has long stressed the importance of maintaining field-by-field and even part-field agronomic and economic records as a basis for optimizing profitability of crop management. As application of precision agriculture technologies increases, the need for such records is becoming even more relevant. However, prior to the availability of affordable computer memory and software for relational database programs on home computers, detailed records were time consuming and subject to many errors and misinterpretations.

The Iowa Crop Management Database (CMD) computer program was developed to help solve several problems of crop management record keeping. Farmers needed programs that were easier to manipulate and provided more comprehensive information while in turn, can be interpreted to improve their management. Agricultural consultants and suppliers needed better records on which to base their recommendations to clients. Publicly-funded education and environmental projects needed better information to measure and report impacts of refined crop management practices on farm profitability, natural resources and the environment.

The Iowa Crop Management Database project goal is to develop a single interactive database for recording comprehensive field-by-field agronomic and economic inputs, and use the power of the computer to generate reports and recommendations to help producers make informed management decisions based on the best available research and technology. The long-term goal is to improve the environmental and economic performance of crop production through increased producer adoption of planning and analysis based on more precise record keeping.

The Iowa Crop Management Database was released for sale in May 1997. The program has been distributed to over 450 farmers, crop consultants, AG educators, and ISU staff. They are using the CMD program to make informed management decisions to improve the agronomic and economic business of Iowa agriculture. The following will report on some of the limited results from 1997 CMD records gleaned from 35 farms located in northeast Iowa.

1997 Consolidated CMD Report

Agronomic and economic information was extracted from Crop Management Database records submitted by 35 farms located in the northeast Iowa counties of Bremer, Buchanan, Black Hawk, Butler, Chickasaw and Floyd. The farms represent 23,580 acres of land and range in size from 96 acres to 2224 acres, with the average size of 649 acres. There are 521 separate fields. Crops grown include corn, soybeans, alfalfa, oats and grass.

Production Costs Per Acre and Crop Unit of corn and soybeans are reported in Tables 1and 2. Each table has been divided in to the lowest cost 1/3, middle cost 1/3, highest cost 1/3 and an Average cost of All production costs. The production costs per unit of grain produced for all fields was sorted from the lowest to the highest and divided into three equal parts. The costs of production for each third was calculated and the results are as shown.

Table 1

Production Costs per Acre & Crop Unit
1997 Corn

	Lowest Cost 1/3	Middle Cost 1/3	Highest Cost 1/3	Average Cost of All
Land	$94.47	$112.84	$114.35	$108.26
Crop Insurance	2.47	3.88	3.39	3.36
Machine Cost	39.44	52.83	60.17	51.40
Labor	8.34	12.42	15.93	12.38
Misc.	4.56	4.19	5.15	6.91
Drying	11.68	5.14	5.23	6.91
Seed	29.89	30.79	31.87	30.85
Fertilizer	42.83	50.90	57.12	50.58
Lime	.00	.06	.09	.05
Herbicide	22.69	30.95	28.14	27.83
Insecticide	1.09	.47	4.59	1.88
Interest	4.76	5.72	8.89	6.42
Total	$262.21	$310.17	$334.92	$304.51
Avg. Yield(bu/a)	147.9	147.3	135.3	143.8
Costs/Unit(C/U)	$1.77	$2.11	$2.48	$2.12
Range C/U	$1.23-$1.97	$1.98-$2.24	$2.25-$4.18	
Acres	3341.0	5350.3	3809.2	12610.7

The lowest cost producer has a total cost advantage of $47.96 over the middle cost producer and $72.71 over the highest cost producer. Land, Machine Cost and Fertilizer account for 83% of the middle cost and 76% of the highest cost disadvantage.

Table 2 Production Costs Per Acre & Crop Unit

1997 Soybeans

	Lowest Cost 1/3	Middle Cost 1/3	Highest Cost 1/3	Average Cost of All
Land	$95.83	$114.52	$124.30	$113.41
Crop Insurance	6.08	6.25	7.21	6.58
Machine Cost	35.48	46.25	55.50	46.95
Labor	9.32	10.63	17.78	12.99
Misc.	5.30	5.03	5.19	5.17
Drying	.00	.00	.00	.00
Seed	18.84	19.59	18.29	18.90
Fertilizer	.00	.93	10.99	4.44
Lime	.09	.01	.00	.02
Herbicide	23.18	28.08	31.12	27.95
Insecticide	.00	.00	.00	.00
Interest	3.10	3.90	4.93	4.08
Total	$197.21	$235.19	$275.31	$240.48
Yield(bu/a)	50.7	48.0	47.3	48.5
Costs/Unit(C/U)	$3.89	4.90	5.82	4.96
Range C/U	$2.98-$4.46	$4.47-$5.20	$5.21-$8.28	
Acres	2503.3	3540.3	3627.0	9720.6

The lowest cost producer has a total cost advantage of $37.98 over the middle cost producer and $79.10 over the highest cost producer. Land, Machine Cost and Fertilizer account for 78% of the middle cost and 77% of the highest cost disadvantage.

Table 3 1997 Land Cost based on Realistic Yield Potential

	Acres	Yield/Acre of Realistic Yield Potential	Range of Values	Average Land Costs Per Bushel
Corn	344.4	72 -100	$1.01-$1.67	$1.07
	651.5	101-120	$0.71-$1.12	$0.93
	978.8	121-130	$0.66-$1.34	$0.82
	1838.6	131-140	$0.53-$1.14	$0.78
	2114.1	141-150	$0.45-$1.18	$0.70
	4019.5	151-160	$0.44-$1.06	$0.74
	323.0	161-170	$0.59-$0.86	$0.67
Soybeans	193.3	20-30	$3.23-$4.62	$4.11
	303.3	31-35	$2.66-$3.55	$2.99
	1672.7	36-40	$1.89-$4.54	$2.88
	2516.8	41-45	$1.89-$3.34	$2.52
	3655.4	46-50	$1.17-$3.27	$2.29
	160.7	>50	$1.36-$2.55	$2.06

The Iowa Soils Properties and Interpretations Database (ISPAID) contains a realistic yield goal for each soil in Iowa. The CMD records the soil name and the realistic yield goal for each farm sub-field. The land cost as shown in table 1 for each field is divided by the realistic yield goal for that field. The result is the Land Cost per bushel of realistic crop yield.

The best producing land rents at the lowest cost per bushel of realistic yield potential. The middle and highest cost producers in table 1 and 2 are paying more for lower producing land than the lowest cost producers.

Table 4 1997 Soil Test Values & Average Pounds of Fertilizer P_2O_5 and K_20 Applied

Relative level	Range in ppm	Acres	% of Total	# of P_2O_5 Applied/Acre
Phosphorus				
Very Low	0-8	114	2	47.0
Low	9-15	397	7	46.0
Optimum	16-20	582	10	64.0
High	21-30	1873	34	47.2
Very High	31+	2611	47	39.1
Potassium				
Very Low	0-60	117	2	45.5
Low	61-90	103	2	114.0
Optimum	91-130	508	9	11.0
High	131-170	2320	42	98.1
Very High	171+	2530	45	79.9

Phosphorus fertility levels are high or very high on 81% and potassium fertility levels are high or very high on 87% of the samples reported. Soils testing high or very high will not have an economic yield benefit from additions of P_2O_5 or K_20. The lowest cost producers have a fertilizer cost advantage because excessive fertilizer is used.